PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PAT266 WO	**FOR FURTHER ACTION** See Form PCT/IPEA/416	
International application No. PCT/FI2005/000088	International filing date *(day/month/year)* 11-02-2005	Priority date *(day/month/year)* 12-02-2004
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Anpap Oy et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 12 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 12.08.2005	Date of completion of this report 08-02-2006
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Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Cover sheet

INTERNATIONAL PATENT CLASSIFICATION (IPC):

D21H 27/00 (2006.01)
D04H 1/72 (2006.01)
D01G 25/00 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2005/000088

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☐ the international application in the language in which it was filed

☐ a translation of the international application into _____ ,
which is the language of a translation furnished for the purposes of:

☐ international search (Rules 12.3(a) and 23.1(b))

☐ publication of the international application (Rule 12.4(a))

☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-7 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* 9-10 as amended (together with any statement) under Article 19

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1/1 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2005/000088

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-7	YES
	Claims		NO
Inventive step (IS)	Claims	1-7	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention relates to a procedure for dry forming of a fibre layer and an apparatus therefore. The object of the invention is to achieve an even layer over the entire width of the forming layer.

Reference is made to the following documents:

D1:EP 0536904 A1
D2:US 20030066168 A1

Document D1 discloses a process and an apparatus for dry forming of fibrous material to a web. The apparatus (see fig. 1) has a former into which fibres are blown, a wire on which the web is formed and below the forming wire a suction box. The air from the suction box can be recycled to the former via ducts (4). The ducts are substantially equal and cover the entire transverse width of the forming wire. The ducts are provided with regulating means (5) wherewith the air current in each duct can be separately adjusted to permit regulation of the air current in the transverse direction of the wire so as to produce an optimally uniform transverse profile for the material web, see column 3, line 49 to column 4, line 10.

D1 is considered to represent the closest state of the art. The subject matter in claims 1 and 3 differs from the method and apparatus in D1 in that the suction box is divided into sections by channels separated from each other and that the channel specific adjustment of the circulation airflow is made during operation. Due to this feature, an adjustable flow rate

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

can also be provided in the suction box, resulting in a process to make an even layer over the entire width of the forming layer. By making the adjustment of the airflow during operation, the apparatus need not be stopped and this results in an effective process.

Consequently, with the background of D1, the problem is to develop a method and a device to make it possible to achieve an adjustable flow rate in the suction box and a flexible adjustment during operation.

D2 describes a device for dry forming of fibres in which the suction below the web is divided in several suction boxes, in which each is disposed with a valve for the purpose of adjusting the quantity of air extracted from the suction boxes, see paragraph [0057). The airflow from the suction box is not circulated back.

No relevant combination of the cited documents would lead a person skilled in the art to the invention defined in the claims.

Therefore, the invention defined in claims 1-7 is novel and is considered to involve an inventive step. It is also considered to be industrially applicable.

CLAIMS

1. A procedure in dry formation of a fibre layer, in which procedure fibre-containing air is passed through a forming wire (7) moving via a former (2) or an equivalent distributor unit and further through a suction box (8) or equivalent via channels (11) with an adjustable flow rate, where the suction box or equivalent being placed below the forming wire, and which air is circulated back to the upper part of the same or another former via channels (17) with an adjustable flow rate, **characterized** in that the channel-specific adjustment of the circulation airflow is made during operation by decreasing or increasing the cross-sectional area of the mouths of the channels (17) placed above the forming wire.

2. A procedure according to claim 1, **characterized** in that the channel-specific adjustment of the circulation airflow is made at both sides of the forming wire (7) during operation by decreasing or increasing the cross-sectional area of the mouths of the channels (17) placed above the forming wire (7), and by decreasing or increasing the cross-sectional area of the mouths of the channels (11) placed in the suction box (8).

3. An apparatus (1) in dry formation of a fibre layer, said apparatus comprising at least one former (2) or an equivalent distributor unit, a forming wire (7) moving below the former and at least one with adjustable channels (11) equipped suction box (8) below the forming surface of the forming wire (7) and a system of circulation air channels leading from the suction box (8) to the upper side of the same or some other former or an equivalent distributor unit, the circulation air channels having channel system (9) equipped with regulating element (18) and divided into substantially separate channels (17), **characterized** in that the number of channels (11) in the suction box (8) is substantially the same as the number of channels (17) in the channel system (9).

4. An apparatus according to claim 3, **characterized** in that the cross-sectional area of channels (11) and their width in the transverse direction of the forming wire (7) at the upper surface of the suction box (8) has been fitted to correspond to the corresponding dimensions of channels (17) at the upper edge of the drum part of the former (2).

5. An apparatus according to claim 3 or 4, **characterized** in that the regulating element (18) of the channels (17) of the channel system (9) has been fitted to be adjusted during operation of the apparatus.

6. An apparatus according to claim 3, 4 or 5, **characterized** in that the channels (11) in the suction box (8) has been fitted to lead in a converging manner into an exhaust duct (12) provided at the side of the suction box (8) and leading to a fan (13).

7. An apparatus according to any one of the preceding claims 3-6, **characterized** in that the cross-sectional areas of channels (17) at the junction between the upper part of the former and the channels (17) are mutually substantially equal, and that the total width of channels (17) covers substantially the entire transverse width of the forming wire (7) at the junction of the upper part of the former.